

## Section-A (MCQ's)

Q.1 Choose the correct answer for each from the given options:

- (i)  $\begin{bmatrix} 5 & 0 \\ 0 & 7 \end{bmatrix}$  is a \_\_\_\_\_ matrix.  
 (a) Diagonal (b) Scalar (c) Rectangular (d) Column
- (ii) The mean of 30 observations is 100, their sum is \_\_\_\_\_.  
 (a) 900 (b) 1000 (c) 1500 (d) 3000
- (iii) The polynomial expression  $-\frac{1}{4} + 2x + 5$  w.r.t the terms is called \_\_\_\_\_.  
 (a) Monomial (b) Binomial (c) Trinomial (d) None of these
- (iv)  $\log_e 1 =$  \_\_\_\_\_.  
 (a) 1 (b) a (c) 0 (d) 10
- (v) An inscribed angle of a major arc is \_\_\_\_\_.  
 (a) Acute (b) Obtuse (c)  $90^\circ$  (d) None of these
- (vi)  $x^3y^6 + 125 =$  \_\_\_\_\_.  
 (a)  $(xy^2 - 5)(x^2y^4 + 5xy^2 + 25)$  (b)  $(xy^2 + 5)(x^2y^4 - 5xy^2 + 25)$   
 (c)  $(xy^2 + 5)(x^2y^4 + 5xy^2 + 25)$  (d)  $(xy^2 - 5)(x^2y^4 - 5xy^2 + 25)$
- (vii) The sub-duplicate ratio of 4:9 is \_\_\_\_\_.  
 (a) 16:81 (b) 2:3 (c) Both (a) & (b) (d) None of these
- (viii)  $\cot 60^\circ =$  \_\_\_\_\_.  
 (a)  $\frac{1}{\sqrt{3}}$  (b)  $\sqrt{3}$  (c)  $\frac{\sqrt{3}}{2}$  (d) 1
- (ix)  $(A \cup B)' =$  \_\_\_\_\_.  
 (a)  $(A \cap B)'$  (b)  $A' \cup B'$  (c)  $A' \cap B'$  (d) None of these
- (x) An angle with measure greater than  $90^\circ$  is called \_\_\_\_\_ angle.  
 (a) Right (b) Congruent (c) Acute (d) Obtuse
- (xi)  $x + 1 = 0$ , is a \_\_\_\_\_ equation.  
 (a) Quadratic (b) Linear (c) Non-Linear (d) Irrational
- (xii) In triangle ABC,  $m\angle B = 90^\circ$  then  $a^2 + c^2 =$  \_\_\_\_\_.  
 (a)  $a^2$  (b)  $-a^2$  (c)  $-b^2$  (d) None of these
- (xiii)  $\sqrt[n]{x^m} =$  \_\_\_\_\_.  
 (a)  $x^{mn}$  (b)  $x^{n/m}$  (c)  $x^{m+n}$  (d)  $x^{m/n}$
- (xiv) Line segment joining the vertex and to the mid-point of the opposite side of triangle is called \_\_\_\_\_.  
 (a) Altitude (b) Hypotenuse (c) Median (d) None of these
- (xv) The characteristic of  $\log 0.0000225$  is \_\_\_\_\_.  
 (a) 4 (b) 5 (c) -4 (d) -5
- (xvi)  $(a+b)^2 + (a-b)^2 =$  \_\_\_\_\_.  
 (a)  $4ab$  (b)  $-4ab$  (c)  $2(a^2 + b^2)$  (d)  $2(a+b)^2$
- (xvii) The order of  $\begin{bmatrix} a \\ b \end{bmatrix}$  is \_\_\_\_\_.  
 (a)  $2 \times 1$  (b)  $1 \times 2$  (c)  $1 \times 1$  (d)  $2 \times 2$
- (xviii)  $(3, -2)$  is in \_\_\_\_\_ quadrant.  
 (a) First (b) Second (c) Third (d) Fourth
- (xix) If  $A = \begin{bmatrix} 6 & 4 \\ 3 & 2 \end{bmatrix}$ , then  $|A| =$  \_\_\_\_\_.  
 (a) 6 (b) 4 (c) 2 (d) 0
- (xx) Absolute value of -5 is \_\_\_\_\_.  
 (a) -5 (b)  $\pm 5$  (c) 5 (d) None of these

## Section-B

Note: Solve any TEN of the following questions. Each question carries 05 marks.

- Q.2 Find the value of  $x - y$  when  $x + y = -9$  and  $xy = 20$ .
- Q.3 Find the factors of  $a^2(b-c) + b^2(c-a) + c^2(a-b)$ .
- Q.4 If  $A = \{1, 2, 3, 4\}$ , find the two sets B and C that are subset of A such that  $B \subseteq C$ .
- Q.5 Prove that  $\cot \theta + \tan \theta = \cot \theta \sec^2 \theta$ .
- Q.6 Find the logarithm of 125 to the base  $5\sqrt{5}$ .
- Q.7 Discuss the advantages of tabulation and classification.
- Q.8 Simplify  $\frac{4}{x^2 - 4x - 5} + \frac{8}{x^2 - 1}$ .
- Q.9 If  $x + 7 : 2(x + 14)$  is the duplicate ratio of  $5 : 8$ , find the value of x.
- Q.10 Find the solution set of  $|5y - 3| - 6 = 3$ .
- Q.11 Prove that, the sum of measures of the angles of a triangle is  $180^\circ$ .

Q.12 Eliminate 'y' from the equation:  $y + \frac{1}{y} = b$  and  $y^3 + \frac{1}{y^3} = a^3$

Q.13 If  $y = \sqrt{5} - 2$ , find the value of  $y^2 - \frac{1}{y^2}$

Q.14 Find the inverse of  $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$

Q.15 Define any ONE of the following terms and illustrate by drawing figure.  
 Adjacent angles Vertically opposite angles

## Section-C

Note: Solve any TWO of the following questions. Each question carries 15( 8 + 7) marks.

Q.16 (a) Solve by using logarithm:  $\frac{\sqrt{673.3}}{\sqrt[3]{58.4}}$

(b) Simplify:  $\frac{4^m \times 15^{4m-2n+1} \times 9^{n-2m}}{10^{2m} \times 25^{m-n}}$

Q.17 (a) Construct a triangle ABC in which  $m\overline{AB} = 4.5\text{cm}$ ,  $m\overline{BC} = 5\text{cm}$ ,  $m\angle B = 60^\circ$  and draw its circumscribed.

(b) Find the value of:  $\frac{\tan 30^\circ + \tan 45^\circ}{1 - \tan 30^\circ \tan 45^\circ}$

Q.18 (a) Solve the using matrices:  $4x + y = 2$  and  $7x + 2y = 3$ .

(b) Prove that, congruent chords of a circle are equidistant from its centre.